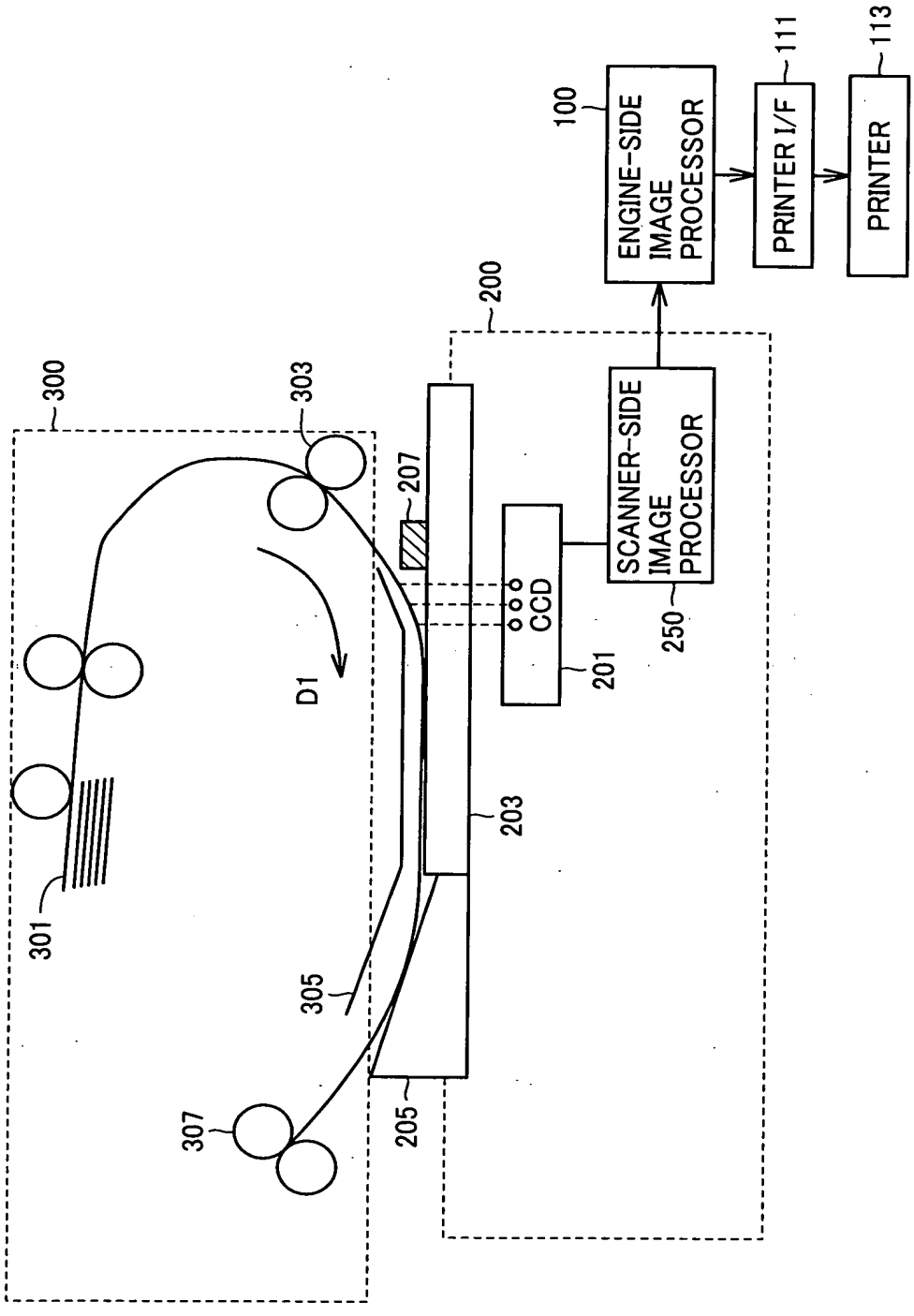

100
ENGINE-SIDE IMAGE PROCESSOR
111
PRINTER I/F
113
PRINTER
200
300
303
207
SCANNER-SIDE IMAGE PROCESSOR
250
CCD
201
D1
203
301
305
307
205

FIG.1

FIG.2

BLOCK DIAGRAM FOR OVERALL COLOR IMAGE PROCESSING

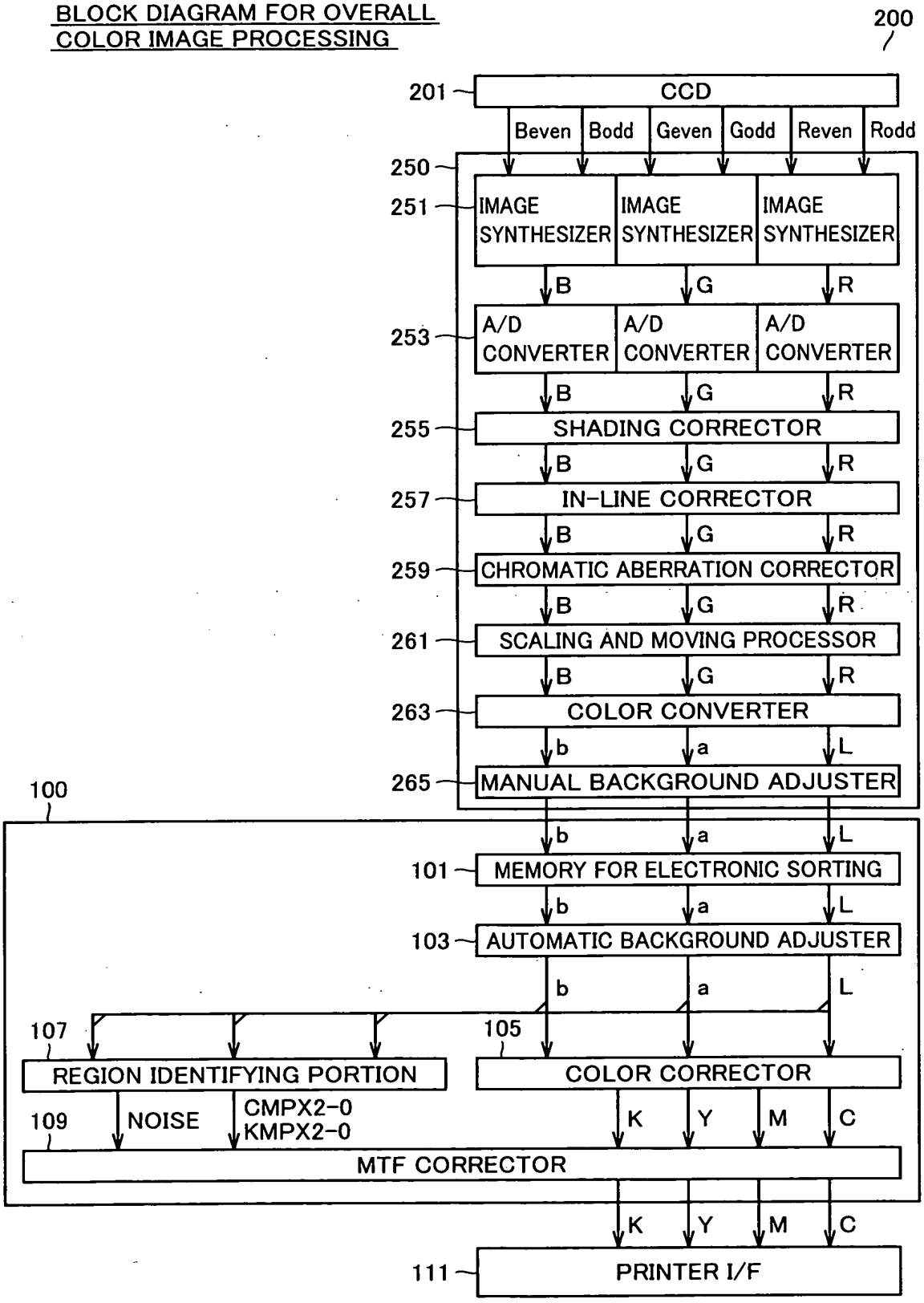


FIG.3

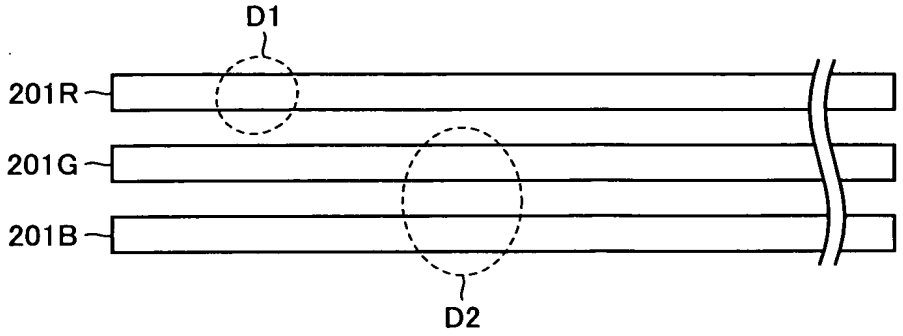


FIG.4

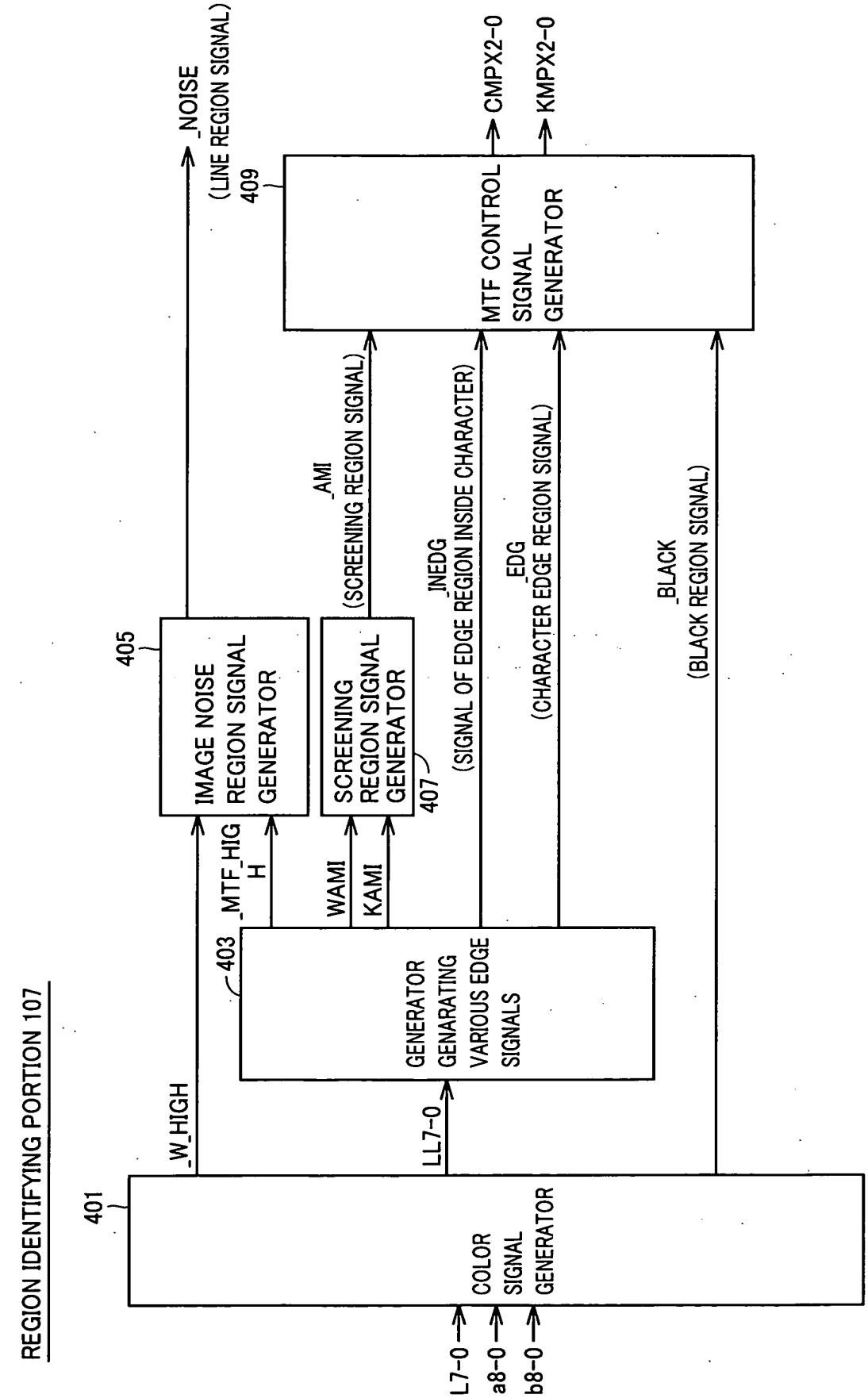

REGION IDENTIFYING PORTION 107
401
COLOR SIGNAL GENERATOR
L7-0
a8-0
b8-0
_W_HIGH
LL7-0
403
GENERATOR GENARATING VARIOUS EDGE SIGNALS
_MTF_HIGH
WAMI
KAMI
405
IMAGE NOISE REGION SIGNAL GENERATOR
SCREENING REGION SIGNAL GENERATOR
407
_AMI
(SCREENING REGION SIGNAL)
_INEDG
(SIGNAL OF EDGE REGION INSIDE CHARACTER)
_EDG
(CHARACTER EDGE REGION SIGNAL)
_BLACK
(BLACK REGION SIGNAL)
409
MTF CONTROL SIGNAL GENERATOR
_NOISE
(LINE REGION SIGNAL)
CMPX2-0
KMPX2-0

FIG.5

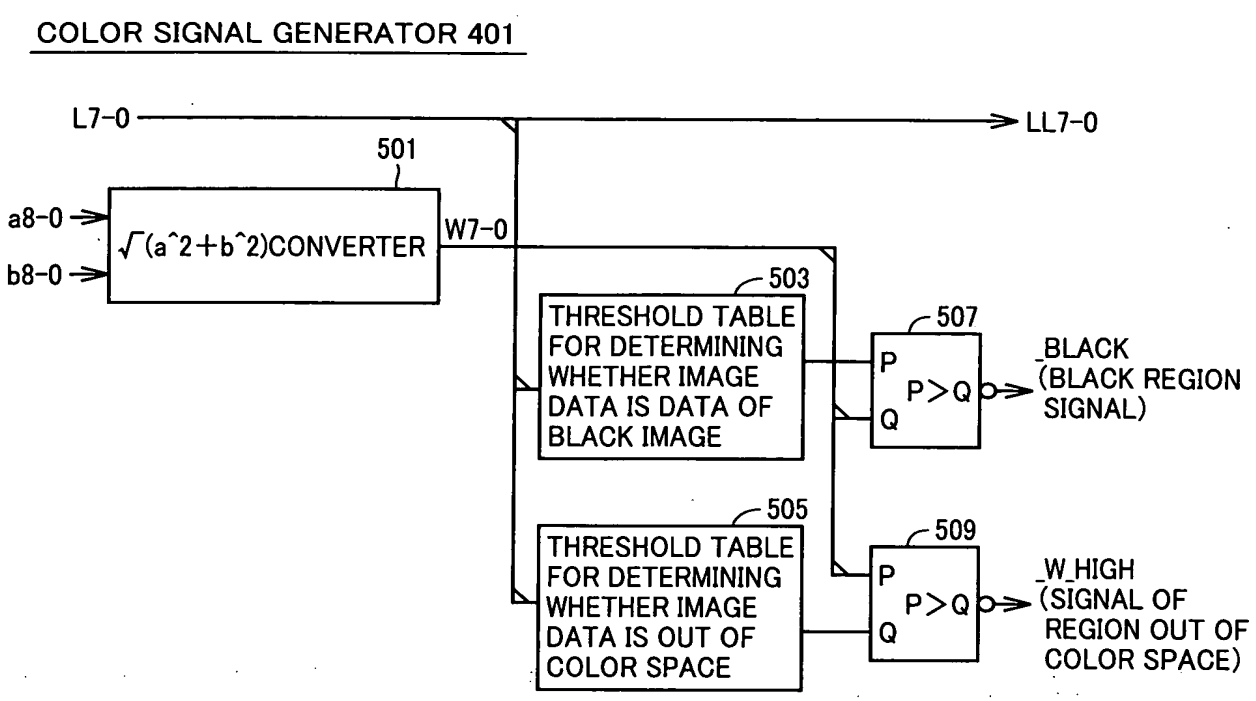

COLOR SIGNAL GENERATOR 401
L7-0
LL7-0
501
a8-0
b8-0
√(a^2+b^2)CONVERTER
W7-0
503
THRESHOLD TABLE FOR DETERMINING WHETHER IMAGE DATA IS DATA OF BLACK IMAGE
507
P
Q
P>Q
_BLACK (BLACK REGION SIGNAL)
505
THRESHOLD TABLE FOR DETERMINING WHETHER IMAGE DATA IS OUT OF COLOR SPACE
509
P
Q
P>Q
_W_HIGH (SIGNAL OF REGION OUT OF COLOR SPACE)

FIG.6

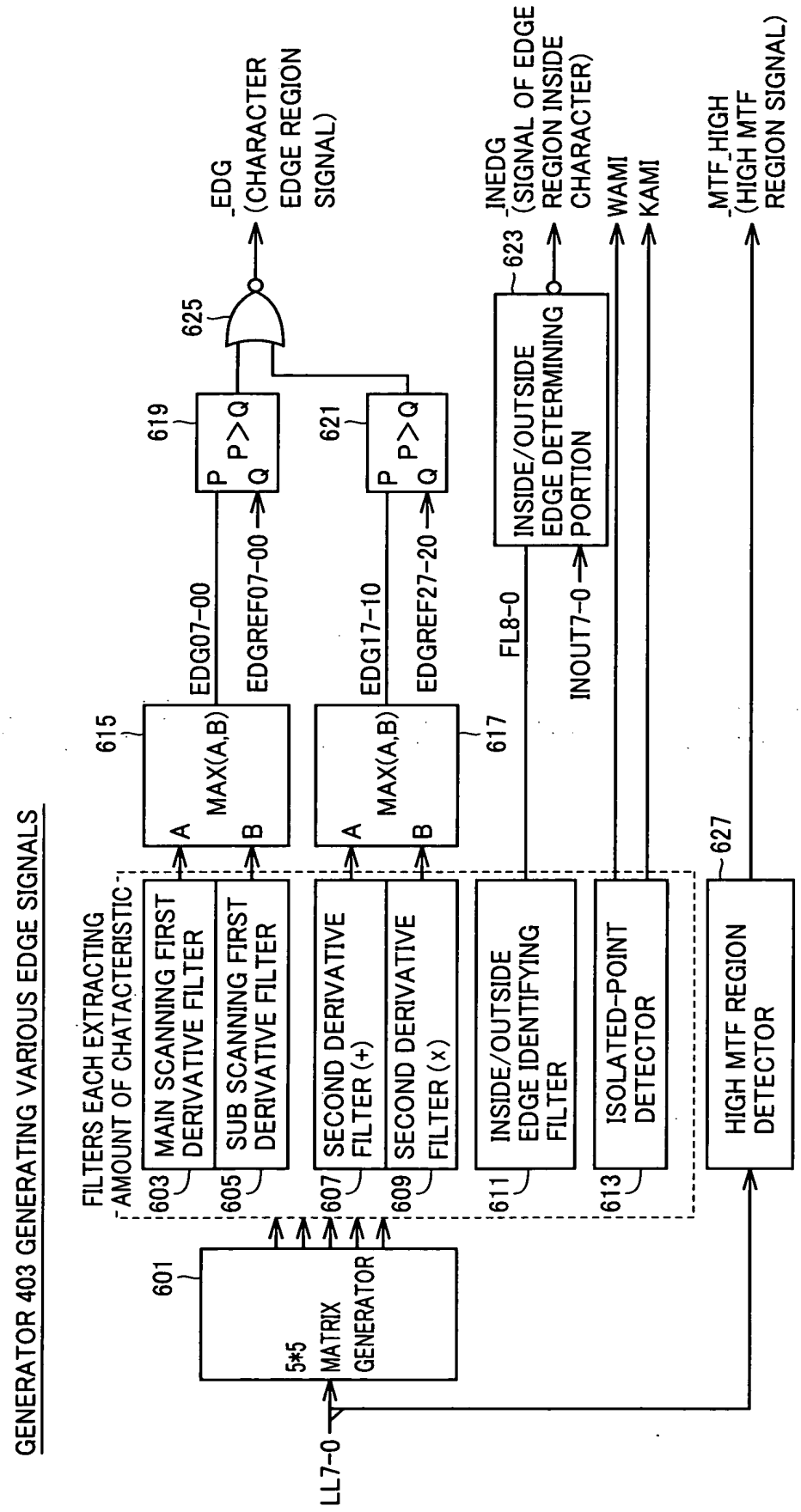

GENERATOR 403 GENERATING VARIOUS EDGE SIGNALS
LL7-0
601
5*5 MATRIX GENERATOR
FILTERS EACH EXTRACTING AMOUNT OF CHATACTERISTIC
603
MAIN SCANNING FIRST DERIVATIVE FILTER
605
SUB SCANNING FIRST DERIVATIVE FILTER
607
SECOND DERIVATIVE FILTER (+)
609
SECOND DERIVATIVE FILTER (x)
611
INSIDE/OUTSIDE EDGE IDENTIFYING FILTER
613
ISOLATED-POINT DETECTOR
627
HIGH MTF REGION DETECTOR
615
MAX(A,B)
617
MAX(A,B)
EDG07-00
EDGREF07-00
EDG17-10
EDGREF27-20
FL8-0
INOUT7-0
619
P P>Q Q
621
P P>Q Q
625
623
INSIDE/OUTSIDE EDGE DETERMINING PORTION
EDG (CHARACTER EDGE REGION SIGNAL)
INEDG (SIGNAL OF EDGE REGION INSIDE CHARACTER)
WAMI
KAMI
MTF_HIGH (HIGH MTF REGION SIGNAL)

FIG.7

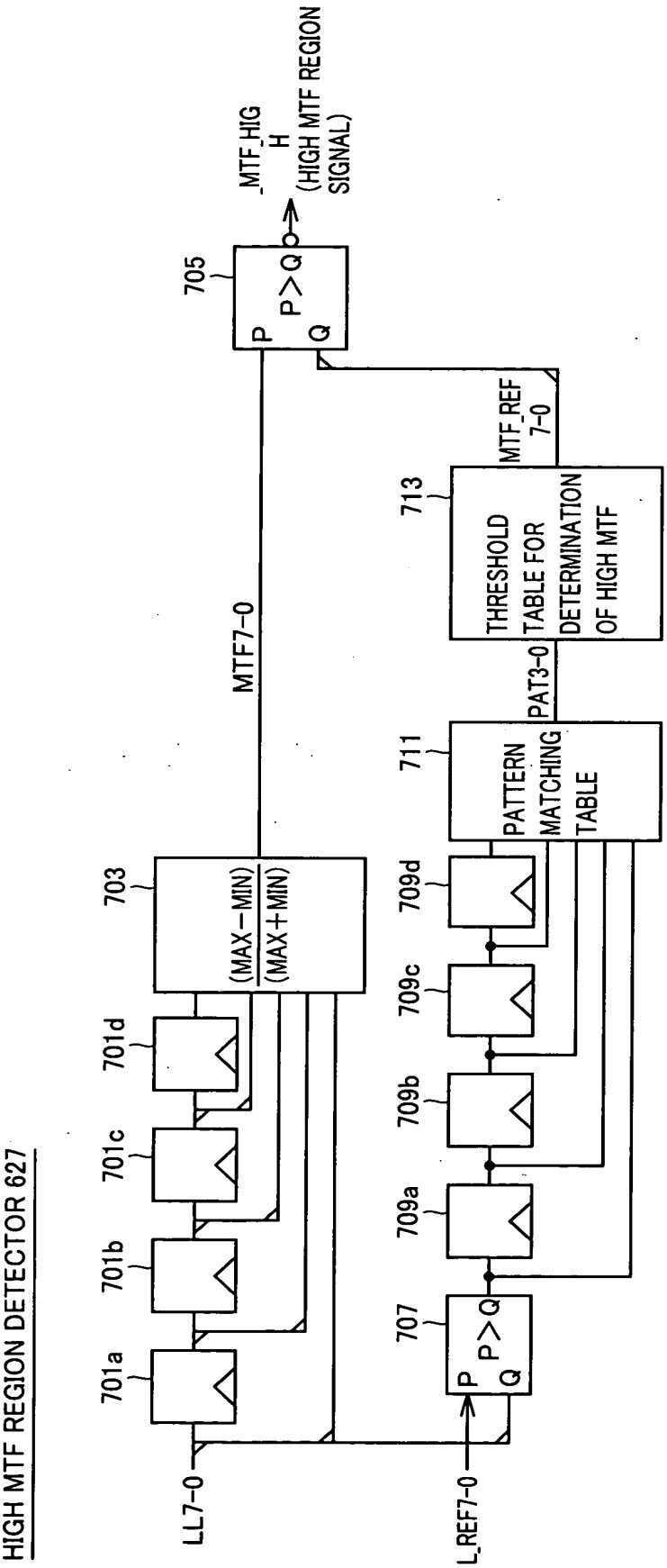
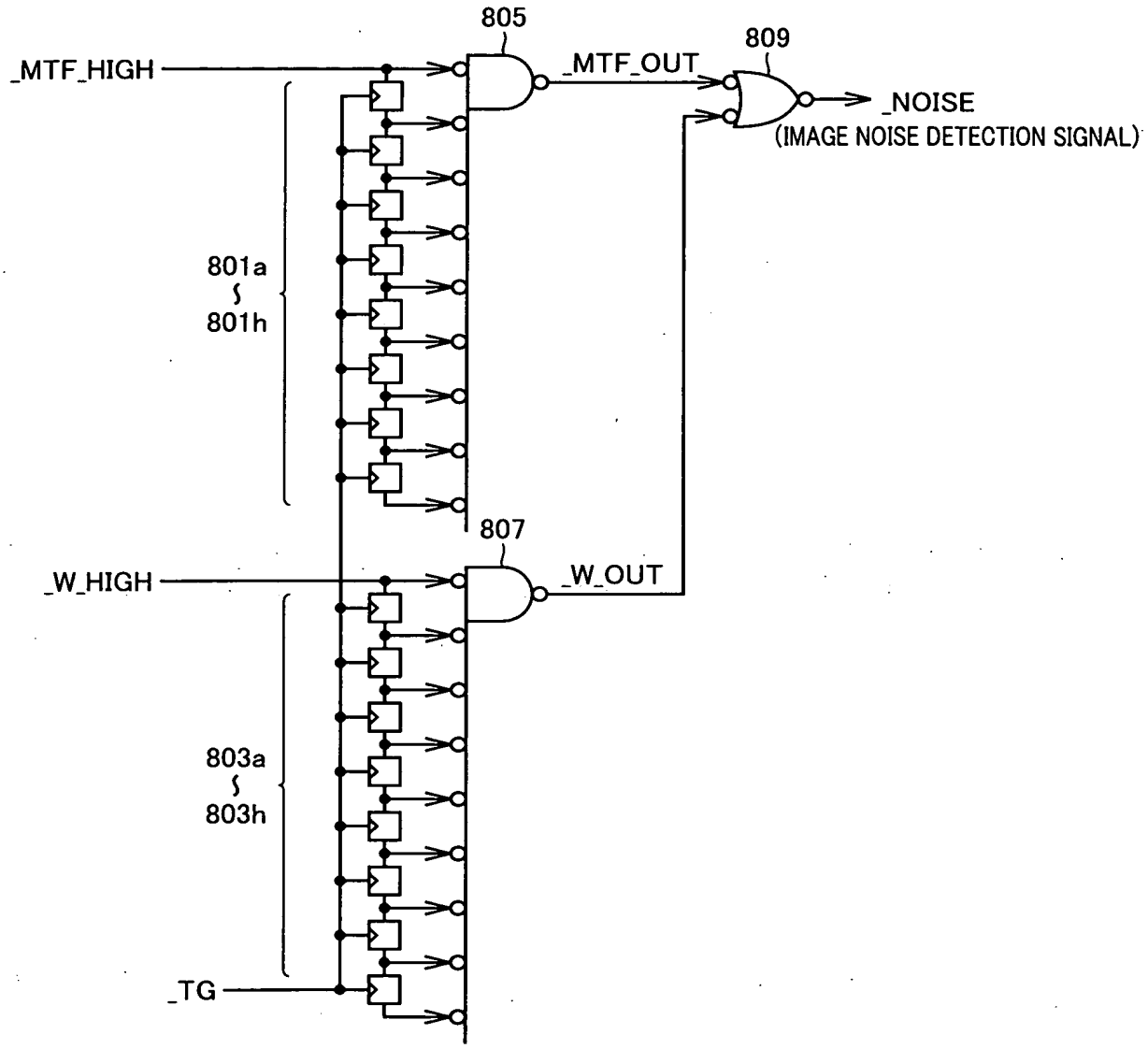

HIGH MTF REGION DETECTOR 627
LL7-0
L_REF7-0
701a
701b
701c
701d
703
(MAX−MIN)/(MAX+MIN)
705
P
Q
P>Q
_MTF_HIGH (HIGH MTF REGION SIGNAL)
MTF7-0
707
709a
709b
709c
709d
711
PATTERN MATCHING TABLE
PAT3-0
713
THRESHOLD TABLE FOR DETERMINATION OF HIGH MTF
MTF_REF 7-0

FIG.8

IMAGE NOISE REGION SIGNAL GENERATOR 405



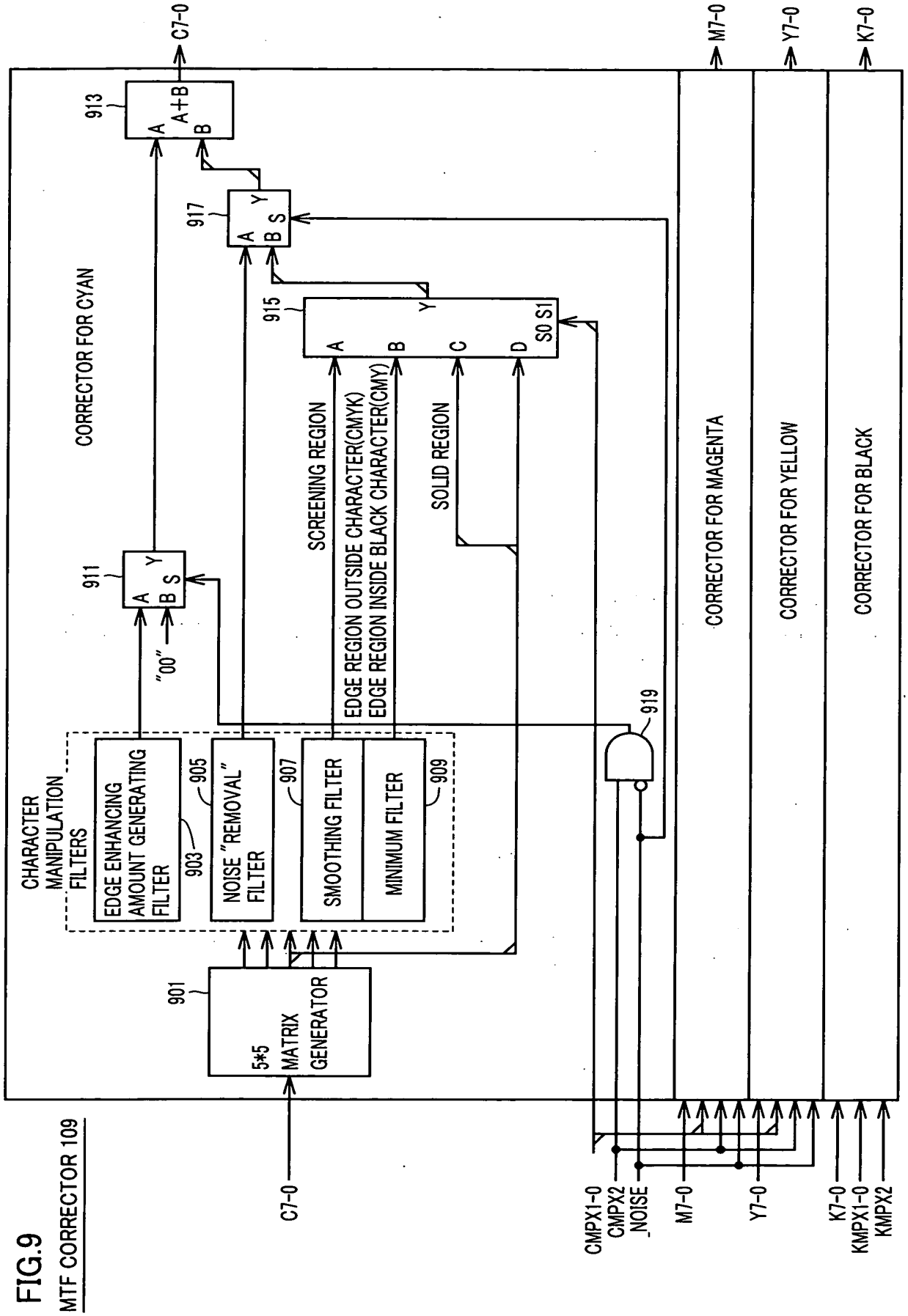


FIG.9
MTF CORRECTOR 109

FIG.10

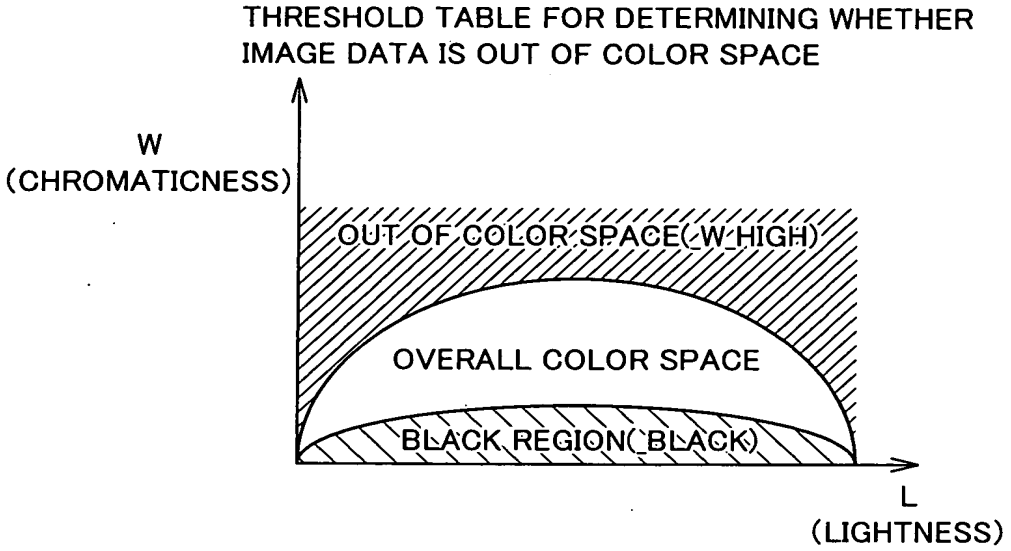

THRESHOLD TABLE FOR DETERMINING WHETHER IMAGE DATA IS OUT OF COLOR SPACE
W
(CHROMATICNESS)
OUT OF COLOR SPACE(W HIGH)
OVERALL COLOR SPACE
BLACK REGION(BLACK)
L
(LIGHTNESS)

FIG.11

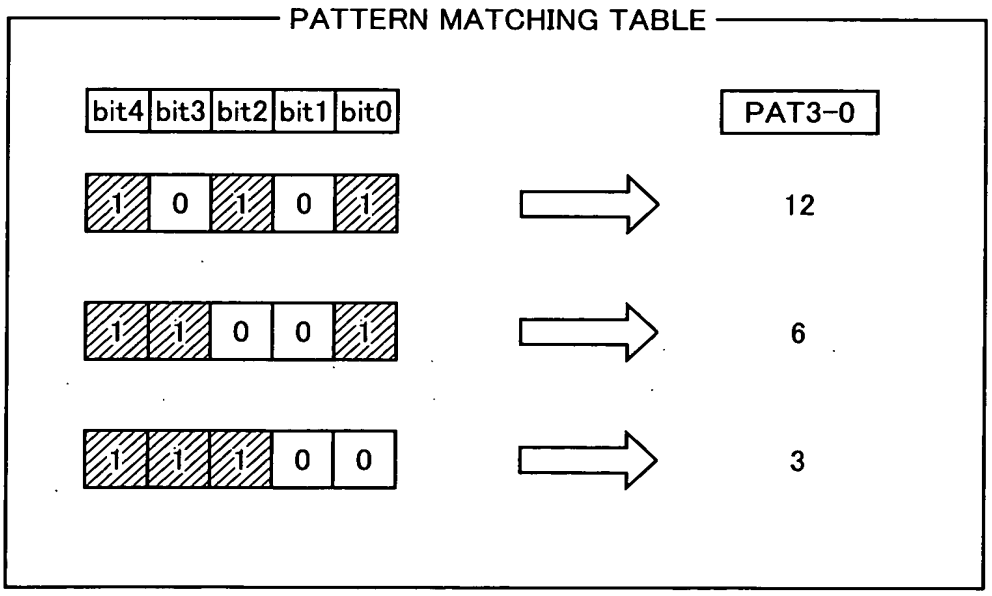

PATTERN MATCHING TABLE
bit4 bit3 bit2 bit1 bit0
PAT3-0
1 0 1 0 1
12
1 1 0 0 1
6
1 1 1 0 0
3

FIG.12

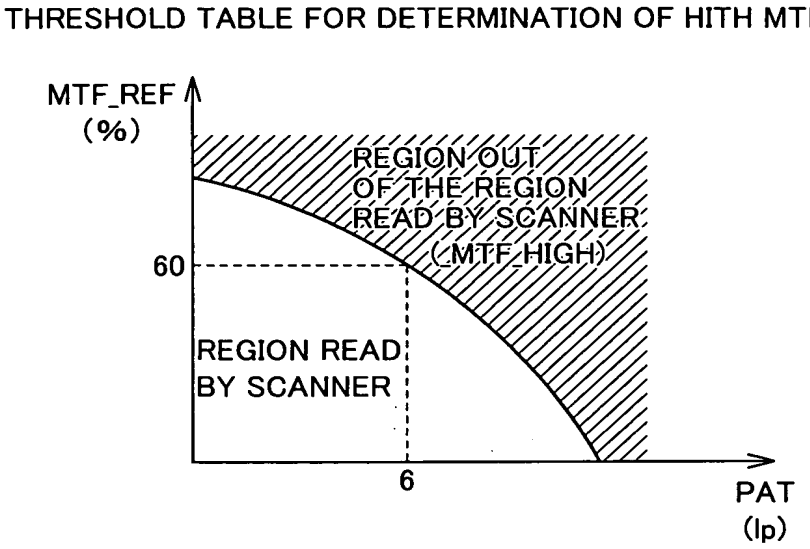

THRESHOLD TABLE FOR DETERMINATION OF HITH MTF
MTF_REF
(%)
REGION OUT OF THE REGION READ BY SCANNER (MTF_HIGH)
60
REGION READ BY SCANNER
6
PAT
(lp)

FIG.13

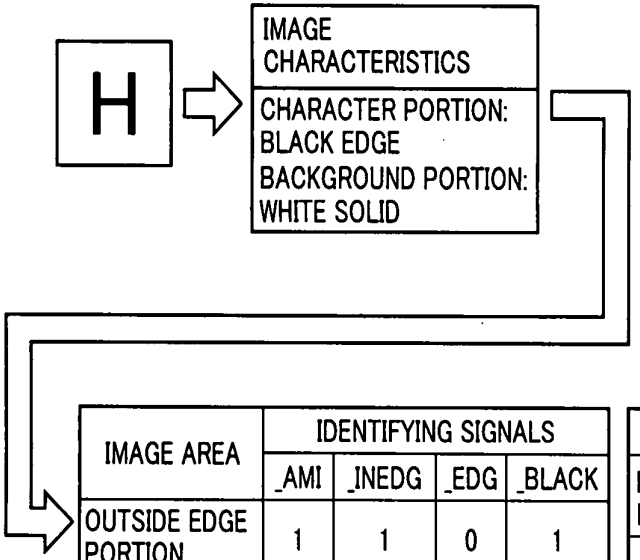


IMAGE AREA	IDENTIFYING SIGNALS			
	_AMI	_INEDG	_EDG	_BLACK
OUTSIDE EDGE PORTION	1	1	0	1
INSIDE EDGE PORTION	1	0	0	0
SOLID PORTION	1	1	1	1

MTF CONTROL SIGNAL FOR CMY				MTF CONTROL SIGNAL FOR K			
BASE MANIPULATION	CMPX1-0	EDGE ENHANCEMENT	CMPX2	BASE MANIPULATION	KMPX1-0	EDGE ENHANCEMENT	KMPX2
MINIMUM PROCESSING	1	NO	1	MINIMUM PROCESSING	1	NO	1
MINIMUM PROCESSING	1	NO	1	NO MANIPULATION	2	YES	0
NO MANIPULATION	2	NO	1	NO MANIPULATION	2	NO	1

APPLN. FILING DATE: FEBRUARY 10, 2004
TITLE: IMAGE PROCESSING APPARATUS AND METHOD DETERMINING NOISE IN IMAGE DATA
INVENTOR(S): HIROYUKI SUZUKI ET AL.
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FIG.14

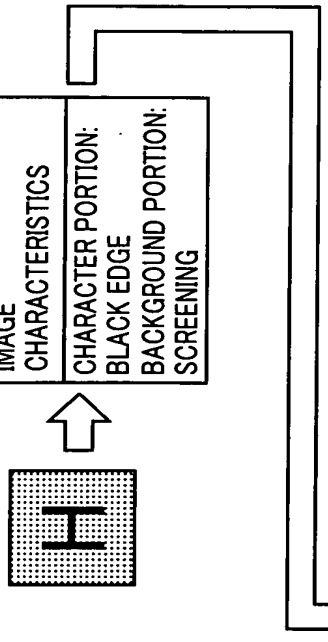

IMAGE CHARACTERISTICS
CHARACTER PORTION: BLACK EDGE
BACKGROUND PORTION: SCREENING

IMAGE AREA	IDENTIFYING SIGNALS			
	_AMI	_INEDG	_EDG	_BLACK
OUTSIDE EDGE PORTION	0	-	-	-
INSIDE EDGE PORTION	0	-	-	-
SOLID PORTION	0	-	-	-

MTF CONTROL SIGNAL FOR CMY				MTF CONTROL SIGNAL FOR K			
BASE MANIPULATION	CMPX1-0	EDGE ENHANCEMENT	CMPX2	BASE MANIPULATION	KMPX1-0	EDGE ENHANCEMENT	KMPX2
SMOOTHING	0	NO	1	SMOOTHING	0	NO	1
SMOOTHING	0	NO	1	SMOOTHING	0	NO	1
SMOOTHING	0	NO	1	SMOOTHING	0	NO	1

FIG.15

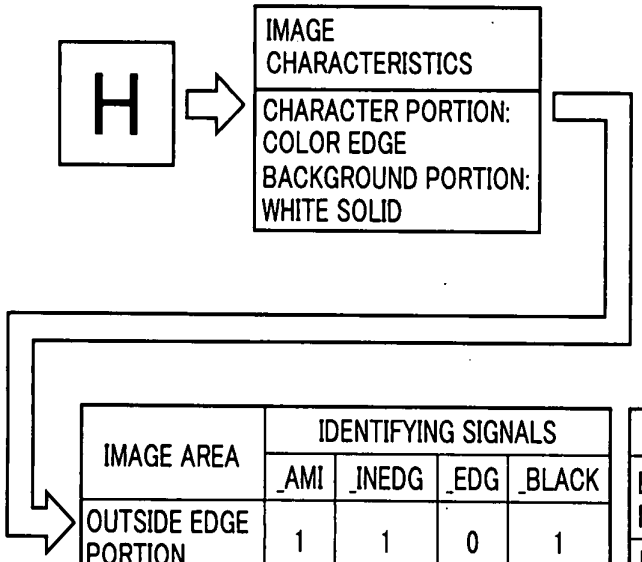

IMAGE AREA	IDENTIFYING SIGNALS			
	_AMI	_INEDG	_EDG	_BLACK
OUTSIDE EDGE PORTION	1	1	0	1
INSIDE EDGE PORTION	1	0	0	1
SOLID PORTION	1	1	1	1

MTF CONTROL SIGNAL FOR CMY				MTF CONTROL SIGNAL FOR K			
BASE MANIPULATION	CMPX1-0	EDGE ENHANCEMENT	CMPX2	BASE MANIPULATION	KMPX1-0	EDGE ENHANCEMENT	KMPX2
MINIMUM PROCESSING	1	NO	1	MINIMUM PROCESSING	1	NO	1
NO MANIPULATION	2	YES	0	NO MANIPULATION	2	YES	0
NO MANIPULATION	2	NO	1	NO MANIPULATION	2	NO	1

APPLN. FILING DATE: FEBRUARY 10, 2004
TITLE: IMAGE PROCESSING APPARATUS AND METHOD DETERMINING NOISE IN IMAGE DATA
INVENTOR(S): HIROYUKI SUZUKI ET AL.
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FIG.16

NOISE REMOVAL FILTER 905

2	1	0	1	2